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November 2, 1993

EX PARTE

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Re: PR Docket No. 93-61
Automatic Vehicle Monitoring Systems

Dear Mr. Caton:

On Tuesday, November 2, 1993, the attached letter was presented to Chairman Quello, Commissioner Barrett and Commissioner Duggan, and to Ralph A. Haller, Chief, Private Radio Bureau and Thomas P. Stanley, Chief Engineer.

Two copies of this letter are being submitted to the Secretary of the Commission pursuant to § 1.1206(a)(1) of the Commission's Rules.

Please contact the undersigned if you have any questions or require additional information concerning this matter.

Sincerely,

Henry M. Rivera

Henry M. Rivera

cc: Chairman Quello
Commissioner Barrett
Commissioner Duggan
Ralph A. Haller, Chief, Private Radio Bureau
Thomas P. Stanley, Chief Engineer

1 copy

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List A B C D E

November 2, 1993

The Honorable James H. Quello
Chairman
Federal Communications Commission
Room 802
1919 M St. NW
Washington, DC 20554

The Honorable Andrew C. Barrett
Commissioner
Federal Communications Commission
Room 844
1919 M St. NW
Washington, DC 20554

The Honorable Ervin S. Duggan
Commissioner
Federal Communication Commission
Room 832
1919 M St. NW
Washington, DC 20554

Re: PR Docket No. 93-61
Automatic Vehicle Monitoring

Dear Chairman Quello, Commissioner Barrett and Commissioner Duggan:

The undersigned manufacturers, users and trade associations are vitally concerned with the future of low power, Part 15 equipment operating on an authorized but unlicensed basis in the 902-928 MHz frequency band. We wish to call your attention to the above-referenced proceeding which proposes to establish a new service in this band, the Location Monitoring Service ("LMS"). It is believed that this proposal, if adopted, will jeopardize the very existence of the Part 15 industry as well as the millions of users that benefit from, and use, Part 15 equipment. At this time, we understand that the LMS proposal will be before you for a vote in December or January.

The undersigned have filed various Comments and Reply Comments, and have visited with the Commission staff concerning this proceeding. The purpose of this letter is not to reargue our positions. Rather, it is to provide you with a very brief synopsis of the record and the problems the undersigned and the Commission

will suffer if the proposals announced in the Notice of Proposed Rulemaking are adopted.

The record in this proceeding unequivocally demonstrates that Part 15 equipment is likely to cause interference to, and receive interference from, the proposed wide-band LMS systems.[1/] The undersigned are aware of no technical way to eliminate this interference, and the proponents of the technology have offered none. As a result, if the Commission's proposals are adopted, LMS licensees receiving interference from Part 15 devices would have the right to petition the Commission to require the Part 15 equipment to cease operations pursuant to Sections 15.5(b) and (c) of the Rules.[2/]

Adoption of LMS as proposed in the Notice will cause insurmountable problems. For example, it will have a devastating impact on the hundreds of millions of dollars already invested, and to be invested, in research and development of Part 15 equipment.[3/] It will also cause the loss of many American jobs,[3/] and will

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1/ Proponents of LMS have argued that Part 15 interests must be ignored in this proceeding on the ground that Part 15 operations are secondary, and, therefore, must accept any interference. While Part 15 is certainly secondary to existing licensed services, it is wrong to suggest that the Commission may not consider the consequences to millions of Part 15 users in creating a new licensed service, like LMS, which greatly expands existing AVM interim rules. To the contrary, we believe the Commission has a statutory obligation to consider the public interest in existing Part 15 operations in reaching any decision about LMS.

LMS proponents also argue that Part 15 interests need not be considered in this proceeding because the Commission's Notice does not propose to change the rules under which Part 15 operates. This argument, likewise, overlooks the fact that even under existing rules, LMS promises to have a major negative impact on Part 15 operations; and, Part 15 users have every right to be heard on this issue and to have their position considered in this proceeding.

2/ Part 15 products were expressly encouraged to be developed and use this band several years ago; yet, now the Commission seems inclined to bring LMS systems into the same band, despite clear evidence that interference will result (and the earlier-authorized use will be compelled to give way).

3/ It is believed that the specific technology proposed to implement LMS is being developed in foreign countries, and that the equipment developed to deploy LMS will be sourced from Asia. This is in stark contrast to the manufacturing base in the U.S. that

(continued...)

deprive millions of users from employing this highly desirable, robust, efficient and effective equipment. In addition, this action could deny millions of citizens the benefits that Part 15 devices bring to medical applications, protection of life and property, and the implementation of energy efficiency and conservation programs, as well as the advantages of new digital cordless phones and other Part 15 technology operating in this band.[4/] Finally, adoption of the proposal will enmesh the Commission in a massive and impossible enforcement action as the FCC attempts to resolve complaints dealing with Part 15 devices causing interference to LMS systems.[5/]

We hope that you find the potential impact of moving forward with PR Docket No. 93-61, as proposed in the Notice of Proposed Rulemaking, as disturbing as we do.[6/] We ask that you take a hard

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[3/](...continued)
supports a majority of Part 15 equipment and the U.S.-developed technology -- spread spectrum -- which is the basis of the majority of Part 15 applications. Placing U.S. technology and manufacturing jobs at risk, for the benefit of foreign technology and jobs, makes little sense in any context, and certainly should not be part of a reasoned FCC regulatory decision.

[4/] The Commission has recently noted the importance of Part 15 devices. See, e.g., Amendment of the Commission's Rules To Establish New Personal Communications Services (Second Report and Order), FCC 93-451 at ¶ 87 (Oct. 22, 1993).

[5/] The Commission must not lightly take action that renders these mass-market products useless, causing mass confusion and inconvenience to the people who rely on them. The Commission's recent experience with hearing aid compatibility rules is instructive in this regard. The Commission adopted rules that required replacement of millions of business telephone handsets to make them hearing aid compatible. The Commission apparently adopted this rule without fully considering the impact on the thousands of business users whose handsets would have to be replaced. When business users finally learned of the new regulations, only months before they were to take effect, the Commission was deluged with angry letters and phone calls. It became necessary for the Commission to suspend the rule at the last minute, pending a reevaluation of the impact on U.S. business. Access to Telecommunications Equipment and Services by the Hearing Impaired and Other Disabled Persons, 8 FCC Rcd 4958 (1993). The Commission should not make a similar mistake here.

[6/] No party to this proceeding agrees with the proposal in its entirety. Moreover, the record reflects a myriad of technical deficiencies (beyond the mutual interference issue) for which
(continued...)

look at this proceeding and that you urge the Private Radio Bureau to reconsider the initial proposals in favor of ones which more appropriately balance the needs of both the AVM and Part 15 communities. Representatives of the undersigned will be scheduling appointments to discuss this matter more fully with you and your staff within the next few weeks.

Respectfully submitted,

Henry M. Rivera
Counsel for
METRICOM, INC.

/s/ Steven J. Winick
Steven J. Winick
Vice President
ADEMCO

/s/ John A. Prendergast
John A. Prendergast
Counsel For
ALARM INDUSTRY COMMUNICATIONS COMMITTEE

/s/ Lawrence J. Movshin
Lawrence J. Movshin
Counsel For
DOMESTIC AUTOMATION

/s/ Barbara N. McLennan
Barbara N. McLennan
Staff Vice President, Government and
Legal Affairs
Consumer Electronics Group
ELECTRONIC INDUSTRIES ASSOCIATION

6/(...continued)
adequate solutions are not apparent. On the record currently before it, the Commission should abandon its efforts to add additional Part 90 users to the 902-928 MHz band and should withdraw its proposal.

/s/ Richard G. Geiger
Richard G. Geiger
Vice President
ITRON, INC.

/s/ Christopher B. Vallani
Christopher B. Vallani, Esquire
President
NAV GUARD, INC.

/s/ Steve Schear
Steve Schear, Chairman
PART 15 COALITION[1]

/s/ William McGreevy
William McGreevy
Vice President, Engineering
RECOTON CORPORATION

/s/ Olin S. Giles
Olin S. Giles
Vice President-Engineering
SENSORMATIC ELECTRONICS CORPORATION

/s/ James B. DeBello
James B. DeBello
President
SOLECTEK CORPORATION

---

[1] The members of the Part 15 Coalition are: ADEMCO, American Wireless, Amtech Logistics, Axxon/Life Point, California Wireless, California Microwave, Cincinnati Microwave, Cobra Electronics, CYLINK, DAC, Enscan/Itron, Gambatte, Granite Communications, GRE America, Inovonics, Intermec, Metricom, Nav Guard, Persoft, Proxim, Radionics, Real-Time Data, Recoton, ROLM, Salient Communications, Sensormatic, SpectraLink, Spread Spectrum Technologies, Summit Design, Symbol Technologies, Tatung Telecom, Tetherless Access, Uniden Engineering Services, Utilicom, Voyager Technologies, Western Multiplex, Wise Communications and Xircom.

/s/ Henry M. Rivera
Henry M. Rivera
Counsel for
SOUTHERN CALIFORNIA EDISON CO.

/s/ Mitchell Lazarus
Mitchell Lazarus
Counsel For
SYMBOL TECHNOLOGIES, INC.

/s/ Richard Heller
Richard Heller, President
Wireless Communication Systems
TELXON CORPORATION

/s/ Wray C. Hiser
Wray C. Hiser
Associate General Counsel
THOMPSON CONSUMER ELECTRONICS, INC.

/s/ Jeffrey H. Sheldon
Jeffrey L. Sheldon
General Counsel
UTILITIES TELECOMMUNICATIONS COUNCIL

cc: Thomas P. Stanley, Chief Engineer
Office of Engineering and Technology

Ralph A. Haller, Chief
Private Radio Bureau

Mr. William F. Caton
Acting Secretary

1993 SECOND QUARTER

THE MAGAZINE OF MECHANICAL SYSTEMS ENGINEERING

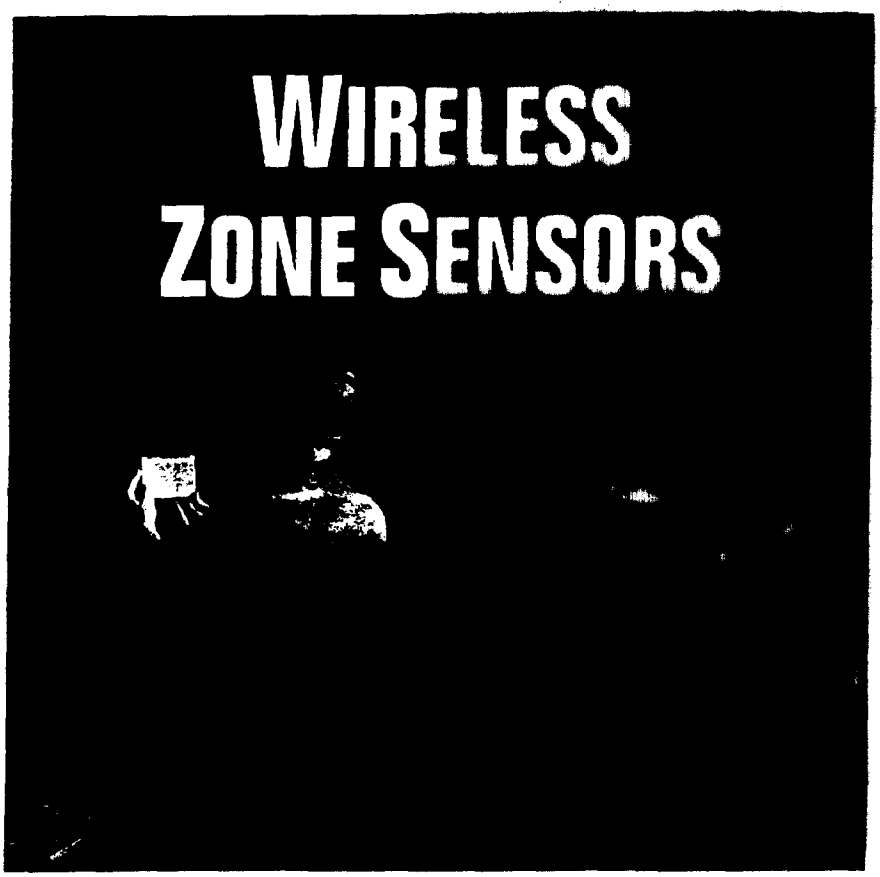
Heating Piping AirConditioning

WIRELESS ZONE SENSORS:
BREAKTHROUGH IN CONTROL FLEXIBILITY

- University boiler plant control
- Classroom ventilation guaranteed
- Kitchen exhaust design

WIRELESS ZONE SENSORS

Radio frequency-based HVAC breakthrough improves DDC/VAV flexibility



By JUD ALEXANDER, ME,
and **RICK ALDRIDGE, EE,**
VAV Business Unit,
The Trane Company,
Rushville, Ind.,
and **DAN O'SULLIVAN, EE,**
ADEMCO,
Syosset, N.Y.

Great strides in building environmental management and comfort control have emerged because of DDC/VAV. Modern building automation systems are microprocessor controlled and integrated to allow precise control of many individual areas. A key component of such a system is the zone sensor, which is the only device in the system that directly affects the most important objective: occupant comfort.

Flexibility, in the form of frequent office rearrangements, is a growing trend in industry today. According to the Building Owners and Managers Association International (BOMA), 50 percent of the existing buildings today annually experience changes in the layout of office and manufacturing space to meet occupancy needs. The HVAC system, and thus the zone sensor location, is optimized at the start-up phase of a project. When portions of the building are rearranged, the HVAC system should ideally be changed to be optimized for the new arrangement. Relocating the zone sensor to provide continued occupant comfort is a key to the HVAC changes. However, the cost of relocating a zone sensor is prohibitive and is oftentimes not considered. Therefore, while a large portion of the office building lends itself well to the changing needs of the occupants, today's wired zone sensors do not.

Imagine being able to move a zone sensor to the best location in a room. Consider the advantages of being able to avoid a hot wall or poor environmental conditions *after* a building is constructed *without* rerouting wires. Imagine the benefits of installing zone sensors *following* new tenant occupancy and *after* it's known exactly where the computer terminals and other heat-generating equipment are located. Wireless zone sensor technology is the solution to this need for DDC/VAV system flexibility.

Convinced wireless technology was a logical step to cutting costs related to new construction, renovation, or retrofit HVAC projects, The Trane Company, in alliance with ADEMCO, a leading security system manufacturer known for its radio frequency expertise, has developed a wireless zone sensor that interfaces with Trane's current DDC/VAV systems.

Pioneering application

Two years of cooperative engineering comprising a multi-disciplined development team located in four sites—Rushville, Ind.; La Crosse, Wis.; St. Paul, Minn.; and Syosset, N.Y.—went into developing the wireless zone sensor. This innovative device pioneers spread spectrum radio communication techniques in an HVAC application. The unit replaces hard-wired zone sensors and adds an element of flexibility not known to the HVAC industry in the past.

Based on spread spectrum radio frequency (RF) technology that has been successfully used in United States military communications for more than 50 years, this wireless device is a breakthrough in HVAC control. When coupled with building automation units, this development is a significant step in engineering efforts to design a more flexible DDC/VAV system.

Proven technology

Wireless control technologies are not new to commercial commu-

nications. Infrared, ultrasonic, and radio frequency controls have been available in a variety of consumer applications for many years.

Remote-controlled entertainment products, automatic garage door openers, security systems, and even the remote RF-controlled locks for doors and trunks available on late model vehicles are common examples of everyday wireless controls.

While *spread spectrum* may not be a household term to commercial and industrial design engineers, it has been around since 1922 as an RF signal processing technique and has been used for the past 50 years by the military to protect communications systems from intentional jamming and naturally occurring interference. In 1985, the Federal Commission made Part 15 unlicensed spread spectrum available to private industry. As a result, the HVAC industry, along with many others, is able to take advantage of this advanced radio communication technique to support real-time radio frequency data communications systems.

Since 1985, military component manufacturers have transitioned their product lines to include commercial markets, making spread spectrum systems economically feasible. Other commercial products using RF spread spectrum include wireless local area networks, wireless PBX phone systems, wireless security systems, remote vehicle location systems, and other navigational applications based on global positioning systems.

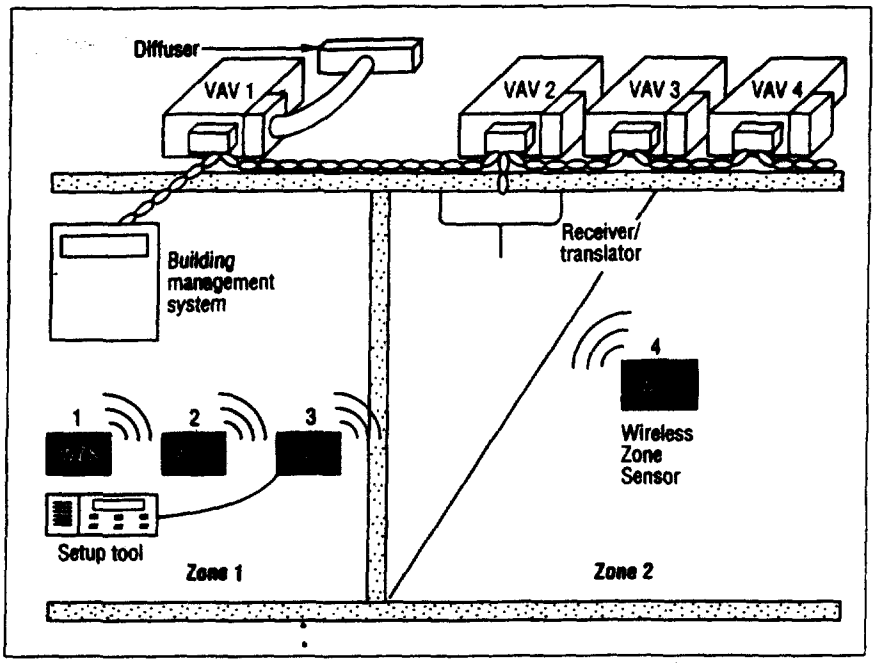
Basic RF operation

Spread spectrum was used in these applications because of its inherent noise immunity and data encryption capability. Each spread spectrum system uses a unique digital code that prevents information from being reviewed by another system.

Basically, a spread spectrum system takes a narrow-band FM signal and mixes it with a unique digital code. This code causes the FM signal to be repeated at many different frequencies at the same time, effectively spreading these narrow-band copies over a wide range of frequencies. The transmitted spread spectrum signal is reconstructed back to the original FM message by combining it with a reference signal in the receiver having the same digital code. At the same time, any interference received is combined with the reference signal and spread out.

This technique of spreading and reconstructing a transmitted message and spreading undesired signals improves RF communication reliability because it reduces interference effects caused by other radio signals and existing electrical noise in a building.

In addition to the interference rejection properties of spread spectrum, this modulation technique is also known for not causing interference. The spread transmitted signal has the characteristics of random noise. This was especially important in military applications because of the difficulty in detecting the presence of a spread spectrum signal. Often, spread spectrum signals are recovered below ambient noise levels and do not interfere with other electronic devices.



1 DDC/VAV controllers.

Features and benefits

In an HVAC application, the wireless zone sensor is an indoor spread spectrum transmitter designed to send room temperature and other status information to a local receiver located up to 1000 ft away. A translator then converts the wireless data to a wired communications link. The data sent on the wired communications link go directly to the VAV terminal controllers as well as the building management system (see Fig. 1).

To allow the VAV terminal controller to know which zone sensor to accept data from, wireless zone sensors are assigned to the VAV terminal controlling the area in which the zone sensors will be located. This assignment is made by connecting a setup tool into the wireless zone sensor. The address of the VAV terminal controller that will be using the temperature and set point information being reported by this wireless zone sensor is entered into the setup tool (Fig. 1).

The wireless system provides benefits that address many common building applications. One example of these applications is when a single VAV terminal is controlling a large zone. As shown in Fig. 1, Zone 1 is an office area controlled by VAV 1. With the wireless system, multiple zone sensors (three

in this example) are assigned to a VAV terminal controller. The DDC controller on VAV 1 takes the temperatures being reported by wireless zone sensors 1, 2, and 3 and averages them to provide a better indication of actual zone temperatures in this area.

Another example of these applications is when multiple VAV terminals are controlling a large bull pen with a single column on which to mount zone sensors. Zone 2 is an area controlled by VAV 2, 3, and 4. In this case, with the wireless system, one zone sensor can be assigned to multiple VAV terminal controllers (three in this example). The DDC controllers on VAV 2, 3, and 4 all have wireless zone sensor 4 assigned to them. Therefore, each of these VAV terminals controls to the temperature and set point being reported by wireless zone sensor 4.

The wireless zone sensor is battery powered and uses lithium batteries to enhance the life of the unit as well as to be environmentally friendly. The wireless transmitters are designed to provide an average battery life of two years. To aid in building maintenance, the zone sensor microprocessor continually monitors battery voltage and reports a low battery condition to the building management system approximately 30 days prior to a dead battery.

In the event that a battery goes dead before maintenance personnel can replace it, the wireless system has a "soft failure" mode. In today's wired zone sensor applications, if a temperature sensor fails, the DDC controller is left in a "hard failure" mode for lack of any temperature input. With the wireless system, a real time back-up wireless zone sensor can be assigned to a DDC controller. An example would be: In Fig. 1, VAV 2, 3, and 4 could be assigned to use wireless zone sensor 3 as a back-up sensor. Since Zone 2 and Zone 1 are adjacent zones, their thermal characteristics might be similar. Thus, if wireless zone sensor 4 fails, the DDC controller immediately begins using the temperature and set point information being reported by zone sensor 3 and provides adequate zone comfort until the failure situation is taken care of by maintenance personnel.

Conclusion

Achieving flexibility with a product that could be competitively offered while maintaining high standards of comfort control was the design team's primary goal. In many instances, wired zone sensors are improperly located on a project due to a countless number of issues. The wireless zone sensor alleviates these issues because it can be installed during the start-up phase of a project and located in its optimum location at that time. Eliminating the use of wires lowers overall installation and material costs as well.

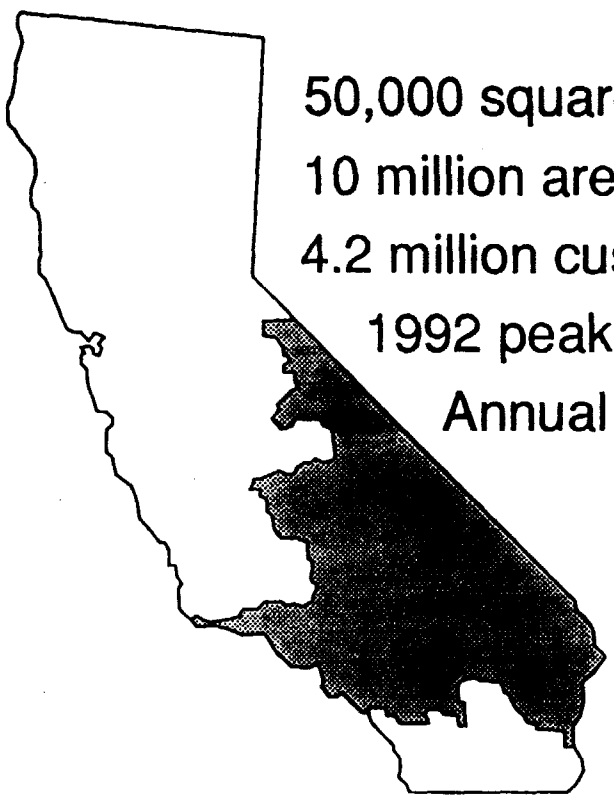
Renovation/retrofit projects benefit greatly with the use of wireless zone sensors. Building changes naturally involve higher maintenance and renovation costs when wired sensors need to be moved as walls change and areas are expanded. With no wires to be pulled, the wireless zone sensor is ideal in these applications.

The wireless zone sensor provides flexibility to everyone in the design and operation of a building through the use of proven, reliable radio communications techniques. Flexibility provides the designer the capability to locate the zone sensor optimally late in the construction cycle, provides the project manager less coordination of the various trades, and provides the owner and occupant the benefit of optimally placing the sensors to provide them with the comfort and control they have come to expect. Ω

Southern California Edison

California, USA

Southern California Edison



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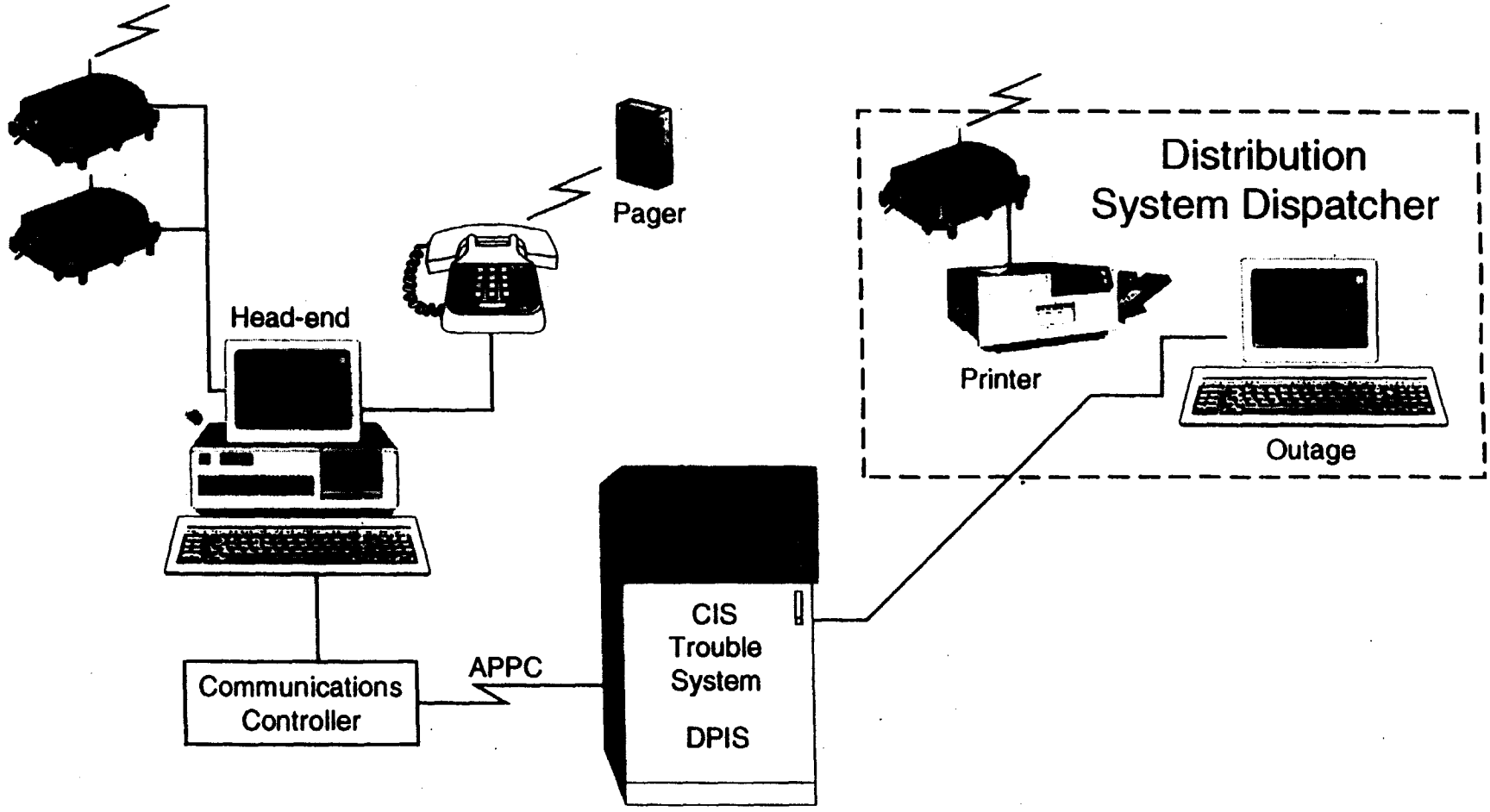

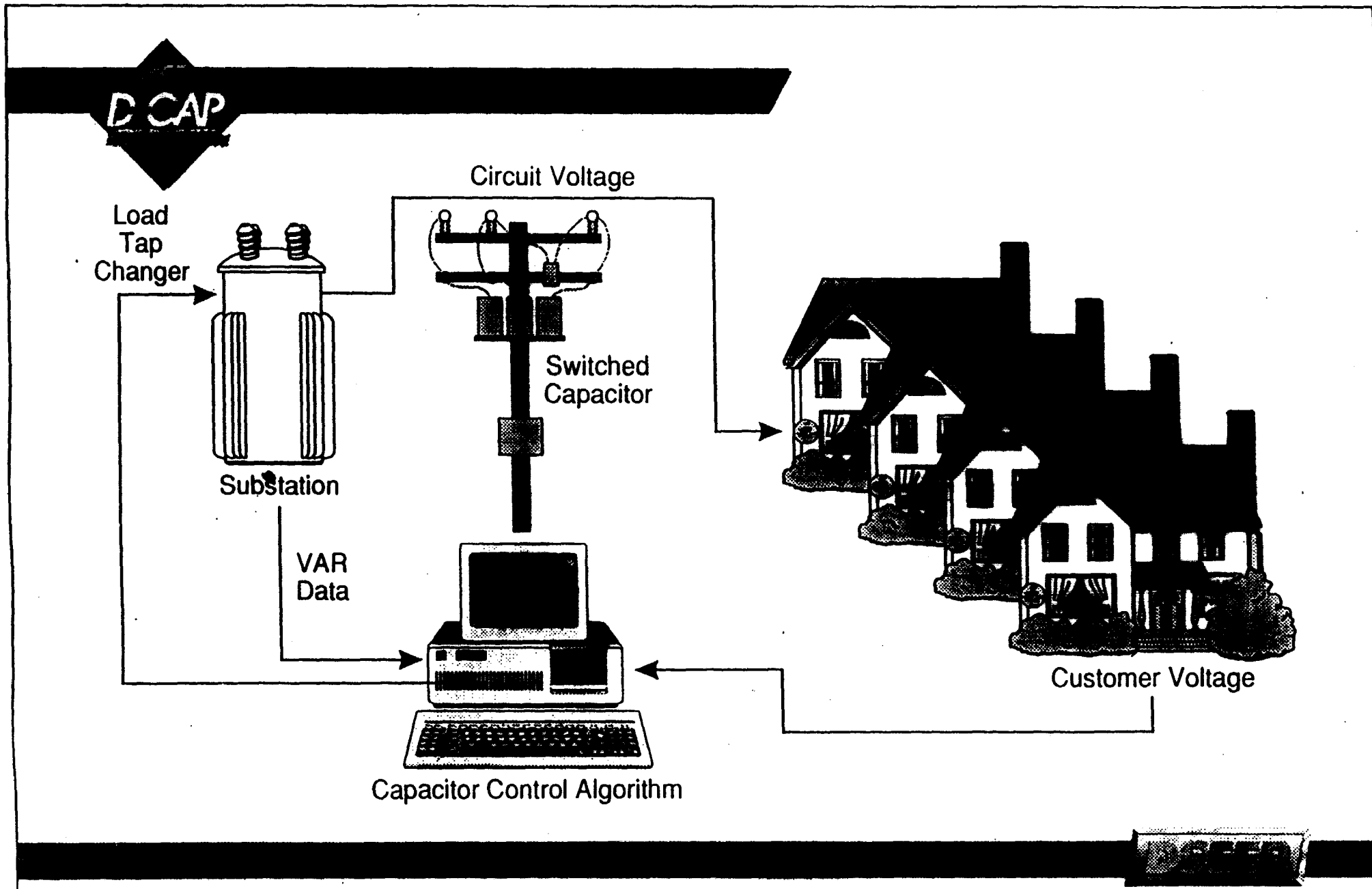
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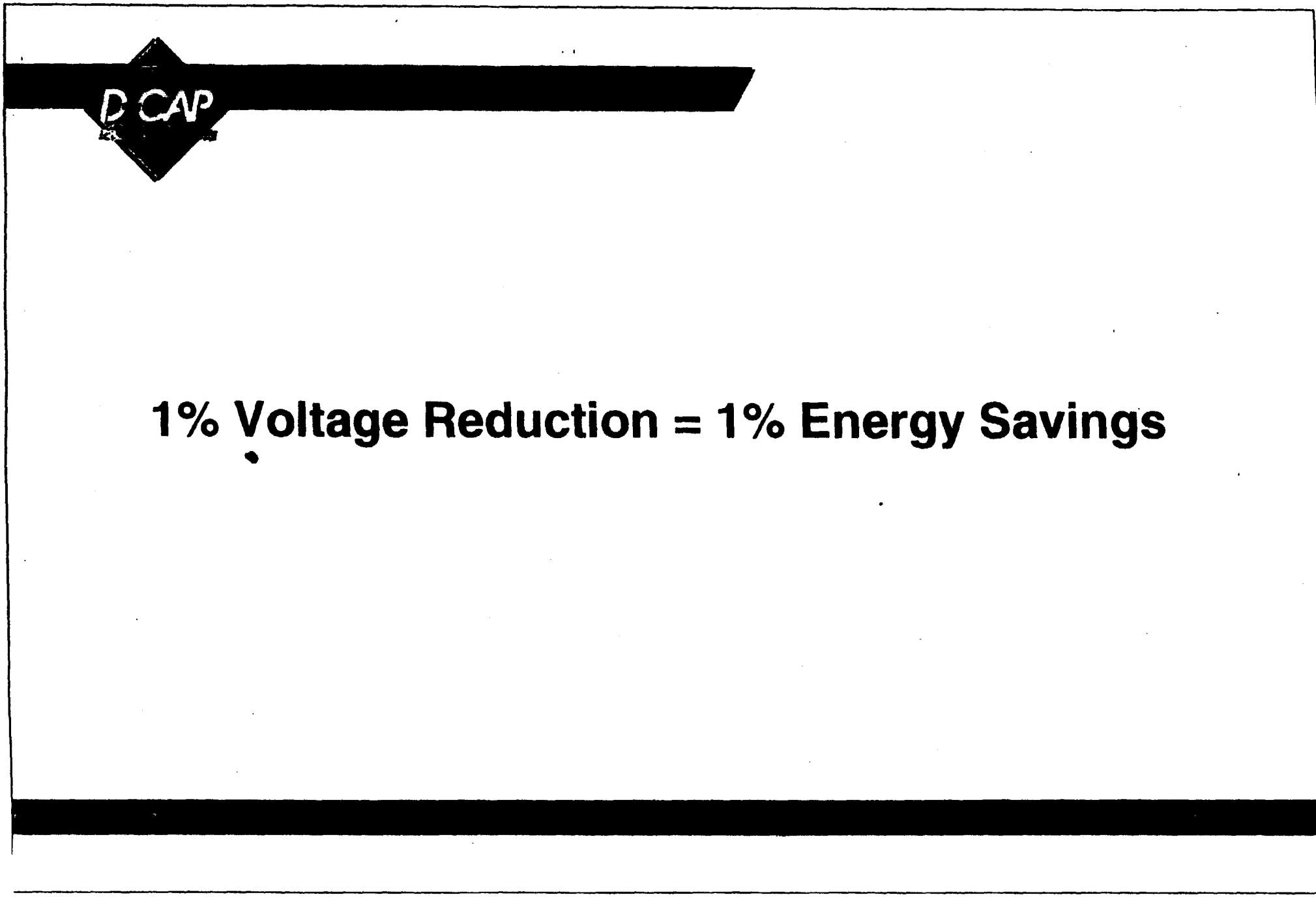
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